

**REMARKS**

The foregoing amendments and these remarks are in response to the Office Action dated October 3, 2008. Applicants hereby request a three month extension of time for filing this response. Authorization is given to charge the appropriate fees to Deposit Account No. 50-0951.

At the time of the Office Action, claims 1-7 were pending. The Office Action notes that a copy of the priority document needed to be forwarded to the USPTO. Objections were raised to the specification and claims 2-4. Claims 2 and 7 were rejected under 35 U.S.C. §112, second paragraph. Claim 1 was rejected under 35 U.S.C. §102(b). Claims 2-7 were rejected under 35 U.S.C. §103(a). Claims 1-7 were rejected on the ground of non-statutory obviousness-type double patenting. The objections and rejections are discussed in more detail below.

**I. Priority**

In the Office Action, a certified copy of the European application is requested. It is noted, however, that this application is a national stage entry of a PCT application. The priority document was transferred from WIPO in accordance with PCT Rule 17.2, and is viewable in the PAIR file of the present application. Withdrawal of this requirement is respectfully requested.

**II. Objections to the Specification**

Objections were raised to the specification because several of the reference numerals were used to designate more than one feature. Appropriate corrections are made herein to the specification, and withdrawal of the objections is thus respectfully requested.

**III. Claims Objections**

Claims 2-4 were objected for the informalities listed in the Office Action. Appropriate corrections are made herein, and withdrawal of the objection is thus respectfully requested.

**IV. Rejection under 35 U.S.C. §112, second paragraph**

Claims 2 and 7 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Appropriate amendments are made herein, and withdrawal of the rejection is thus

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respectfully requested.

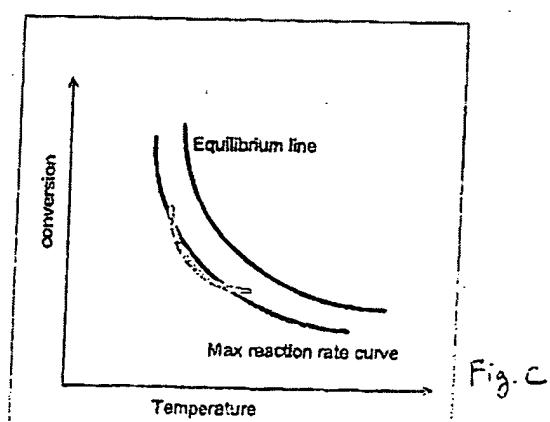
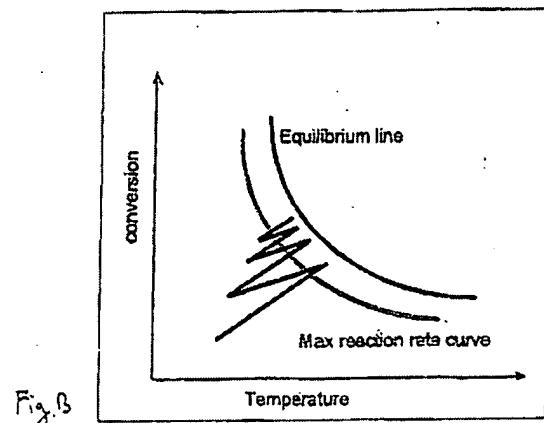
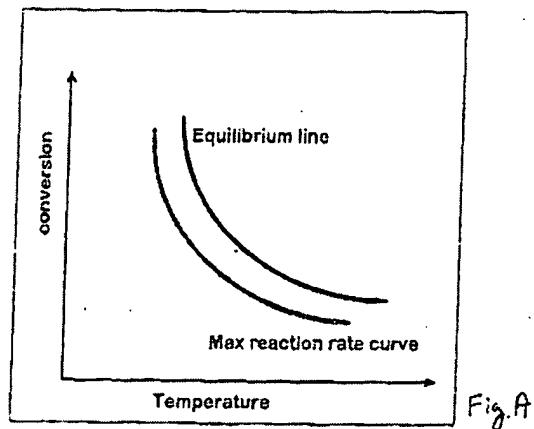
**V. Rejections based upon art**

Claim 1 was rejected under 35 U.S.C. §102(b) as being anticipated by French Patent No. 2,029,533 to Badische et al. ("Badische"). Claim 2 was rejected under 35 U.S.C. §103(a) as being unpatentable over *Badische* in view of European Patent No. 1,236,505 to Filippi et al. ("Filippi"). Claims 3-6 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Badische* as applied to claim 1, and further in view of *Filippi*. Claim 7 was rejected under 35 U.S.C. §103(a) as being unpatentable over *Badische* in view of *Filippi* as applied to claim 3, and further in view of U.S. Patent No. 4,769,220 to Zardi ("Zardi").

Claim 1 has been amended in order to offer an alternative definition of the subject matter claimed therin. Proper support for the amendments can for instance be found, for example, in the description as filed, at page 7, lines 23-27 and figure 1. Claim 2 has been made dependent to claim 1 and has been clarified in order to meet the requirements under 35 USC § 112.

Turning to the prior art, *Badische*, the catalytic mass is distributed in a plurality of distinct, superimposed catalytic beds (or zones) arranged within the reactor shell 8, 120. A part of the reactants is fed at different points of the shell 8, 120 in the free space between successive catalytic beds to control the temperature of the reaction mixture flowing from one bed to the successive one. (See *Badische*, figures 1 and 2 and the corresponding description). To the contrary, in claim 1, a part of the reactants is fed within the catalytic mass of a single catalytic bed at different points of the catalytic mass and at different temperatures and flow-rates.

In order to better explain the advantageous effects obtained by the presently claimed method over the prior art, following are three graphs showing the relationship between temperature (x-axis) and product concentration (y-axis) during the carrying out of an exothermic reaction.



In Figure A, the ideal situation is shown, in which the reactants temperature is controlled in a way that the reaction takes place at the highest conversion rate achievable. In this case, each point of the catalytic mass (where the reaction takes place) has values of temperature and

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composition corresponding to the highest reaction rate possible, thus achieving the highest possible conversion per pass (maximal conversion yield) with a given volume of catalyst.

In Figure B, the conversion rate obtained with the method taught by *Badische* is shown (zig-zag line). In *Badische*, the temperature and the concentration of the reactants are controlled outside the catalytic mass, between successive catalytic beds. When the exothermic reaction takes place within the non-cooled catalytic mass of the different catalytic beds, the conversion rate moves in a oblique straight line from the left to the right showing an increase in temperature (the reaction is exothermic) and product concentration. When the straight line approaches the equilibrium line, the conversion stops (since it has reached its maximum value). At this point the reaction mixture leaves the corresponding catalytic bed and is cooled down with a part of fresh reactants (oblique straight line moving from the right to the left). Once cooled (and diluted), the reaction mixture is then made to react within the catalytic mass of a subsequent catalytic bed, and so on. As can be clearly seen from the graph of Figure B, the conversion rate obtainable with the method of *Badische* is far away from the ideal conversion rate, wherein in only one point of each bed the catalyst operates on the maximum reaction rate curve.

In the method of claim 1, the temperature and the concentration of the reactants flowing in the catalytic mass of the (single) catalytic bed is continuously controlled by feeding fresh reactants within the catalytic mass at different points thereof corresponding to different successive reaction stages taking place in the catalytic bed I., at different temperatures and flow-rates.

It is advantageously possible to carry out the exothermic reaction within the catalytic mass with values of temperature and composition substantially corresponding to the highest reaction rate possible, as shown by the grey curve in Figure C. It follows that for a given volume of catalyst, the presently claimed method allows to obtain a much higher conversion yield and thus a much higher production capacity with respect to the prior art. Therefore, the method of claim 1 allows the achievement of a much better control of the reaction conditions with respect to *Badische*.

The subject matter of claim 1 is patentable over *Badische* in view of *Filippi*. Indeed, the method taught by *Filippi* provides for feeding a part of the fresh reactants within (i.e. inside) a respective heat exchanger, at different points (heights) of the heat exchanger. This is exactly the

opposite of the claimed method in which the reactants are fed within the catalytic bed at different points of its catalytic mass.

For at least the above reasons, it is submitted that the subject matter of amended claim 1 is not anticipated by nor rendered obvious by the cited prior art, and is therefore patentable. The dependent claims are also believed allowable because of their dependence upon an allowable base claim, and because of the further features recited.

#### **VI. Double Patenting Rejection**

Claims 3-7 were provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-3 of co-pending Application No. 11/572,403. Claims 1-7 were rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-10 of U.S. Patent No. 7,186,389 in view of Filippi ("Filippi '389"). Claims 1-6 were rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-6 of U.S. Patent No. 7,087,205 to Filippi et al. (*Filippi '205*).

Obviousness-type double patenting rejection of claims 3-7 is traversed because these claims are dependent upon an allowable base claim.

Obviousness-type double patenting rejection of claims 1-7 over claims 1-10 of *Filippi '389* and obviousness-type double patenting rejection of claims 1-6 over claims 1-6 of *Filippi '205* is also traversed because these documents fail to disclose or suggest the features of the pending claims, including reactants being fed within a catalytic mass of the catalytic bed at different points of the catalytic mass corresponding to different successive stages of the reaction which takes place in the catalytic bed, at respective different predetermined temperatures and flow-rates. As noted above, the prior art merely relates to the feeding of an operating fluid within a heat exchanger at different points (heights) of the heat exchanger. These references are thus totally irrelevant with respect to the subject matter of claims 1-7.

#### **VII. Conclusion**

Applicant has made every effort to present claims which distinguish over the prior art, and it is thus believed that all claims are in condition for allowance. Nevertheless, Applicant invites

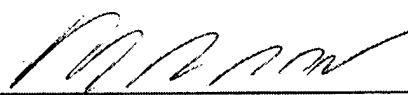
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the Examiner to call the undersigned if it is believed that a telephonic interview would expedite the prosecution of the application to an allowance. In view of the foregoing remarks, Applicant respectfully requests reconsideration and prompt allowance of the pending claims.

Respectfully submitted,

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